

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
9 September 2005 (09.09.2005)

PCT

(10) International Publication Number
WO 2005/081970 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/US2005/005735

(22) International Filing Date: 24 February 2005 (24.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/547,161 24 February 2004 (24.02.2004) US

(71) Applicant (for all designated States except US): **THE CURATORS OF THE UNIVERSITY OF MISSOURI** [US/US]; 475 McReynolds Hall, Columbia, Missouri 65211-2015 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **FORGACS, Gabor** [US/US]; University of Missouri-Columbia, Dept. of Physics & Astronomy, 420 Physics Building, College Avenue, Columbia, Missouri 65211 (US). **JAKAB, Karoly** [RO/US]; University of Missouri-Columbia, Dept. of

Physics & Astronomy, 223 Physics Building, College Avenue, Columbia, Missouri 65211 (US). **NEAGU, Adrean** [RO/RO]; Victor Babes University of Medicine & Pharmacy, Dept. of Biophysics & Medical Informatics, P-ta Eftimie Murgu Nr. 2, R-1900 Timisoara (RO). **MIRONOV, Vladimir** [RU/US]; 812-0 Hideaway Bay Lane, Mount Pleasant, South Carolina 29464 (US).

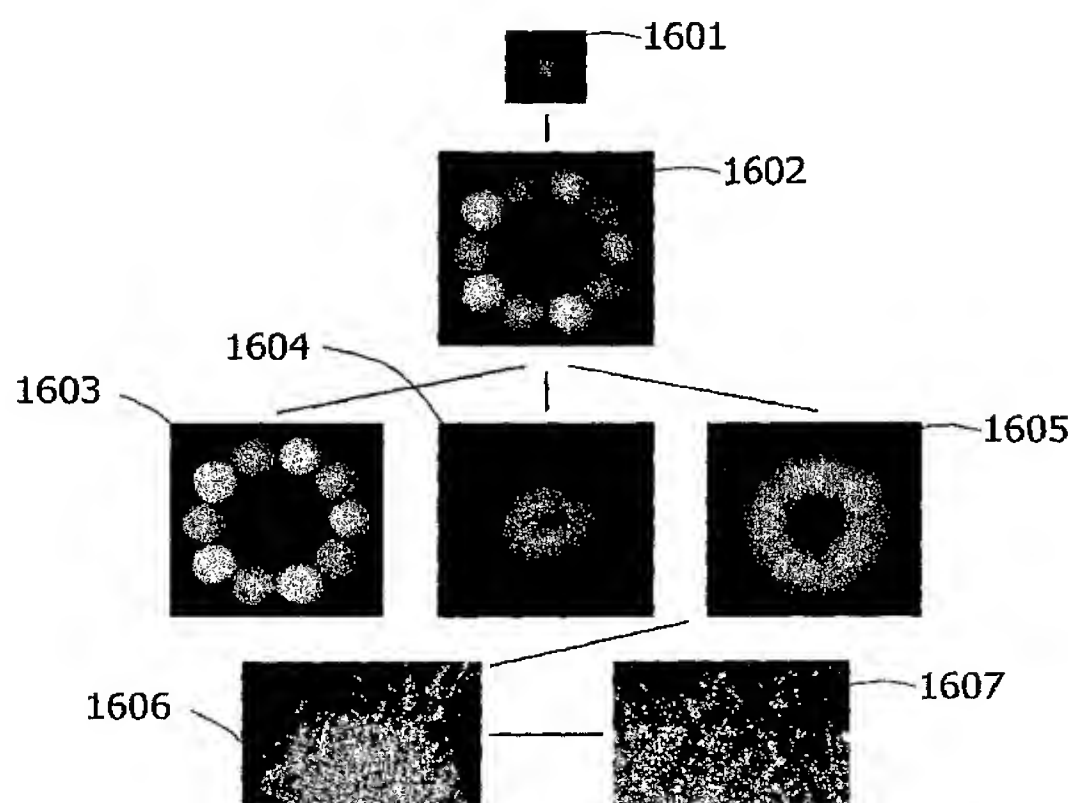
(74) Agents: **JAMES, Kurt, F.** et al.; Senniger, Powers, Leavitt & Roedel, #1 Metropolitan Square, 16th Floor, St. Louis, MO 63102 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: SELF-ASSEMBLING CELL AGGREGATES AND METHODS OF MAKING ENGINEERED TISSUE USING THE SAME



(57) Abstract: A composition comprising a plurality of cell aggregates for use in the production of engineered organotypic tissue by organ printing. A method of making a plurality of cell aggregates comprises centrifuging a cell suspension to form a pellet, extruding the pellet through an orifice, and cutting the extruded pellet into pieces. Apparatus for making cell aggregates comprises an extrusion system and a cutting system. In a method of organ printing, a plurality of cell aggregates are embedded in a polymeric or gel matrix and allowed to fuse to form a desired three-dimensional tissue structure. An intermediate product comprises at least one layer of matrix and a plurality of cell aggregates embedded therein in a predetermined pattern. Modeling methods predict the structural evolution of fusing cell aggregates for combinations of cell type, matrix, and embedding patterns to enable selection of organ printing processes parameters for use in producing an engineered tissue having a desired three-dimensional structure.

WO 2005/081970 A2



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

- *without international search report and to be republished upon receipt of that report*